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EXAMINER	
STAICOVICI, STEFAN	
ART UNIT	PAPER NUMBER
1732	7

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/853,028	YAMAGUCHI ET AL.	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 January 2002* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-31* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *May 11, 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *6* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Specification

1. The abstract of the disclosure is objected to because the abstract should avoid using phrases that can be implied, such as, "disclosed" (see page 48, line 12). It is suggested to replace "disclosed" with –provided--. Correction is required. See MPEP § 608.01(b).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 10 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In claim 10, the limitation that "said masking powder contains resin powder having a different melting point from said thermosetting powder" is unclear because a 'thermosetting" resin material does not have a melting temperature. It should be noted that "thermoplastic" resin materials melt, but "thermosetting" materials do not melt and as such do not have a "melting temperature." Further clarification is required.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 13 and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Bonzo (US Patent No. 4,557,773).

Bonzo ('773) teaches the claimed apparatus for fabricating a ceramic honeycombed filter including, a laser source and a control system that can be used with said laser system to drill openings including, an image analyzer (102), opening forming means (100), such as a low level industrial laser, and a precision jig (103) such that the precision jig (103) and opening forming means (100) operate in response to signals generated by the image analyzer (102) which comprises a scanning means (104) and a processor (105) (minicomputer). Further, Bonzo ('773) teaches that the covering at one end face is scanned by scanning means (104) which generates a set of signals (first set of signals) indicating the locations of the cell ends (22) and/or the thin walls (25) forming the cell ends beneath the covering (28), the signals generated by the scanning means (104) are passed to the processor (105) which, in response to the signals and its own internal programming, generates a second set of signals for positioning and controlling the operation of the device (100) for forming openings through the covering and forming said openings (29) using laser device (100) by melting said covering (28).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Higuchi *et al.* (US Patent No. 4,293,357) in view of Bonzo (US Patent No. 4,557,773).

Higuchi *et al.* ('357) teach the claimed process of fabricating a ceramic honeycombed filter including, providing a honeycomb structure (1) having a large number of mutually adjoining hollow passages, channels or cells (2), said cells (10) extending in an essentially mutually parallel fashion through the structure (1) between open ends faces and having porous walls which extend across and between each of the end faces (see col. 3, lines 1-12 and Figure 2). Further, Higuchi *et al.* ('357) teach covering the first end face with a film, forming a plurality of holes in said film (see col. 3, lines 32-56 and Figure 6) and introducing a sealing material through said holes in said cells (2) by dipping said honeycomb structure (1) and with said film into a dish (10) containing said sealing material (9), hardening said sealing material and removing said film (see col. 4, line 61 through col. 5, line 23 and Figure 8). Further, it should be noted that Higuchi *et al.* ('357) teach removing the film while sintering the sealing material and honeycomb structure to form a unified structure (see col. 4, line 65 through col. 5, line 2).

Regarding claims 1-2 and 4, although Higuchi *et al.* ('357) teach boring of said film, Higuchi *et al.* ('357) does not teach thermal boring of said film. Bonzo ('773) teaches a process for fabricating a ceramic honeycombed filter including, positioning a film (28) and using a laser (thermal melting) to drill a plurality of openings (29) in said film (see col. 7, lines 38-44 and, col. 8, lines 14-20 and 31-35). Further, it should be noted that Bonzo ('773) teaches a variety of

equivalent boring methods such as boring, cutting, heated needles, laser drilling (see col. 8, lines 27-35). Therefore, it would have been obvious for one of ordinary skill in the art to have used a laser to drill apertures as taught by Bonzo ('773) as an alternative to boring in the process of Higuchi *et al.* ('357) because, Bonzo ('773) specifically teaches that laser drilling is an equivalent to boring and also because, both references solve similar problems in a similar process.

In regard to claims 3 and 5, Higuchi *et al.* ('357) does not teach a control system for boring holes in the film. Bonzo ('773) teaches a control system that can be used with a laser system to drill a plurality of openings (29) including, a honeycomb structure (21), an image analyzer (102), opening forming means (100), such as a low level industrial laser, and a precision jig (103) such that the precision jig (103) and opening forming means (100) operate in response to signals generated by the image analyzer (102) which comprises a scanning means (104) and a processor (105) (minicomputer). Further, Bonzo ('773) teaches that the covering at one end face is scanned by scanning means (104) which generates a set of signals (first set of signals) indicating the locations of the cell ends (22) and/or the thin walls (25) forming the cell ends beneath the covering (28), the signals generated by the scanning means (104) are passed to the processor (105) which, in response to the signals and its own internal programming, generates a second set of signals for positioning and controlling the operation of the device (100) for forming openings through the covering and forming said openings (29) using laser device (100) by melting said covering (28). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a laser and control system as taught by Bonzo ('773) to form the holes in the

process of Higuchi *et al.* ('357) because, Bonzo ('773) specifically teaches that the automated process of using a laser and control system to form openings increases efficiency of the process, hence increasing productivity and lowering costs and also because, the film of Higuchi *et al.* ('357) requires openings and both references solve a similar problem of forming plugs in a ceramic honeycombed filter.

8. Claims 6-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 03-169312 in view of Bonzo (US Patent No. 4,557,773) and in further view of Higuchi *et al.* (US Patent No. 4,293,357).

JP 03-169312 teaches the basic claimed process for fabricating a ceramic honeycombed filter including, providing a honeycomb structure having a large number of mutually adjoining hollow passages, channels or cells, said cells extending in an essentially mutually parallel fashion through the structure between open ends faces and having porous walls which extend across and between each of the end faces (see Figure 2), covering an end face with an elastic sheet having a number of openings, placing a thermoplastic/thermosetting resin powder mix (masking powder) into the channels from the opening, fusing the resin powder deposited at the bottom of the channels to form a masking (40) at both ends of the ceramic honeycombed filter structure (see Figure 4) and forcing a sealing material into the open channels not covered by the masking (see Abstract).

Regarding claims 6-8, although JP 03-169312 teaches a porous film, JP 03-169312 does not teach a laser and control system to form the pores. Bonzo ('773) teaches a process for fabricating a ceramic honeycombed filter including, positioning a film (28) and using a laser to

drill a plurality of openings (29) in said film (see col. 7, lines 38-44 and, col. 8, lines 14-20 and 31-35). Further, Bonzo ('773) teaches a control system that can be used with a laser system to drill said openings (29) including, a honeycomb structure (21), an image analyzer (102), opening forming means (100), such as a low level industrial laser, and a precision jig (103) such that the precision jig (103) and opening forming means (100) operate in response to signals generated by the image analyzer (102) which comprises a scanning means (104) and a processor (105) (minicomputer). Further, Bonzo ('773) teaches that the covering at one end face is scanned by scanning means (104) which generates a set of signals (first set of signals) indicating the locations of the cell ends (22) and/or the thin walls (25) forming the cell ends beneath the covering (28), the signals generated by the scanning means (104) are passed to the processor (105) which, in response to the signals and its own internal programming, generates a second set of signals for positioning and controlling the operation of the device (100) for forming openings through the covering and forming said openings (29) using laser device (100) by melting said covering (28). Therefore, it would have been obvious for one of ordinary skill in the art to have provided a laser and control system as taught by Bonzo ('773) to form the openings in the process of JP 03-169312 because, Bonzo ('773) specifically teaches that the automated process of using a laser and control system to form openings increases efficiency of the process, hence increasing productivity and lowering costs and also because, the film of JP 03-169312 requires openings and both references solve a similar problem of forming plugs in a ceramic honeycombed filter.

Further regarding claim 6-8, although the process of JP 03-169312 in view of Bonzo ('773) teaches charging a sealing material, JP 03-169312 in view of Bonzo ('773) does not teach a dipping process for charging said sealing material. Higuchi *et al.* ('357) teach a process of fabricating a ceramic honeycombed filter including, providing a honeycomb structure (1) having a large number of mutually adjoining hollow passages, channels or cells (2), said cells (10) extending in an essentially mutually parallel fashion through the structure (1) between open ends faces and having porous walls which extend across and between each of the end faces (see col. 3, lines 1-12 and Figure 2). Further, Higuchi *et al.* ('357) teach covering the first end face with a film, forming a plurality of holes in said film (see col. 3, lines 32-56 and Figure 6) and introducing a sealing material through said holes in said cells (2) by either forcing under pressure said sealing material (col. 4, lines 44-60) or dipping said honeycomb structure (1) and said film into a dish (10) containing said sealing material (9). Further, Higuchi *et al.* ('357) teach hardening said sealing material and removing said film (see col. 4, line 61 through col. 5, line 23 and Figure 8) while sintering the sealing material and honeycomb structure to form a unified structure (see col. 4, line 65 through col. 5, line 2). Therefore, it would have been obvious for one of ordinary skill in the art to have used a dipping process for charging said sealing material Higuchi *et al.* ('357) in the process of JP 03-169312 in view of Bonzo ('773) because, Higuchi *et al.* ('357) specifically teach equivalent alternative for introducing the sealing material by either forcing under pressure said sealing material (col. 4, lines 44-60) or dipping said honeycomb structure (1) and said film into a dish (10) containing said sealing material (9).

In regard to claims 9-12, JP 03-169312 teaches a masking material having a powder mix of thermoplastic and thermosetting resins including a foaming agent and a fluidity additive.

9. Claims 1-5, 15-22 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonzo (US Patent No. 4,557,773) in view of Higuchi *et al.* (US Patent No. 4,293,357).

Bonzo ('773) teaches the basic claimed process for fabricating a ceramic honeycombed filter including, providing a honeycomb structure (21) having a large number of mutually adjoining hollow passages, channels or cells, said cells extending in an essentially mutually parallel fashion through the structure between open ends faces and having porous walls which extend across and between each of the end faces (23, 24), covering an end face with a film (28) and using a laser to drill a plurality of openings (29) in said film (see col. 7, lines 38-44 and, col. 8, lines 14-20 and 31-35). Further, Bonzo ('773) teaches a control system that can be used with a laser system to drill said openings (29) including, a honeycomb structure (21), an image analyzer (102), opening forming means (100), such as a low level industrial laser, and a precision jig (103) such that the precision jig (103) and opening forming means (100) operate in response to signals generated by the image analyzer (102) which comprises a scanning means (104) and a processor (105) (minicomputer). Further, Bonzo ('773) teaches that the covering at one end face is scanned by scanning means (104) which generates a set of signals (first set of signals) indicating the locations of the cell ends (22) and/or the thin walls (25) forming the cell ends beneath the covering (28), the signals generated by the scanning means (104) are passed to the processor (105) which, in response to the signals and its own internal programming, generates a second set of signals for positioning and controlling the operation of the device (100) for forming

openings through the covering and forming said openings (29) using laser device (100) by melting said covering (28).

Regarding claims 1 and 15-16, although Bonzo ('773) teaches charging a sealing material, Bonzo ('773) does not teach a dipping process for charging said sealing material. Higuchi *et al.* ('357) teach a process of fabricating a ceramic honeycombed filter including, providing a honeycomb structure (1) having a large number of mutually adjoining hollow passages, channels or cells (2), said cells (10) extending in an essentially mutually parallel fashion through the structure (1) between open ends faces and having porous walls which extend across and between each of the end faces (see col. 3, lines 1-12 and Figure 2). Further, Higuchi *et al.* ('357) teach covering the first end face with a film, forming a plurality of holes in said film (see col. 3, lines 32-56 and Figure 6) and introducing a sealing material through said holes in said cells (2) by either forcing under pressure said sealing material (col. 4, lines 44-60) or dipping said honeycomb structure (1) and said film into a dish (10) containing said sealing material (9). Further, Higuchi *et al.* ('357) teach hardening said sealing material and removing said film (see col. 4, line 61 through col. 5, line 23 and Figure 8) while sintering the sealing material and honeycomb structure to form a unified structure (see col. 4, line 65 through col. 5, line 2). Therefore, it would have been obvious for one of ordinary skill in the art to have used a dipping process for charging said sealing material Higuchi *et al.* ('357) in the process of Bonzo ('773) because, Higuchi *et al.* ('357) specifically teach equivalent alternative for introducing the sealing material by either forcing under pressure said sealing material (col. 4, lines 44-60) as

taught in the process of Bonzo ('773) or dipping said honeycomb structure (1) and said film into a dish (10) containing said sealing material (9).

In regard to claims 2-5 and 17-19 Bonzo ('773) teaches a process for fabricating a ceramic honeycombed filter including, positioning a film (28) and using a laser (thermal melting) to drill a plurality of openings (29) in said film (see col. 7, lines 38-44 and, col. 8, lines 14-20 and 31-35). Further, Bonzo ('773) teaches a control system that can be used with a laser system to drill a plurality of openings (29) including, a honeycomb structure (21), an image analyzer (102), opening forming means (100), such as a low level industrial laser, and a precision jig (103) such that the precision jig (103) and opening forming means (100) operate in response to signals generated by the image analyzer (102) which comprises a scanning means (104) and a processor (105) (minicomputer). Further, Bonzo ('773) teaches that the covering at one end face is scanned by scanning means (104) which generates a set of signals (first set of signals) indicating the locations of the cell ends (22) and/or the thin walls (25) forming the cell ends beneath the covering (28), the signals generated by the scanning means (104) are passed to the processor (105) which, in response to the signals and its own internal programming, generates a second set of signals for positioning and controlling the operation of the device (100) for forming openings through the covering and forming said openings (29) using laser device (100) by melting said covering (28).

Specifically regarding claims 20-22, Bonzo ('773) teaches a variety of equivalent boring methods such as boring, cutting, heated needles (heated jig), laser drilling (see col. 8, lines 27-35).

Regarding claim 25, Bonzo ('773) teaches a transparent thermoplastic film (resin film) (see col. 8, lines 5-11).

10. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bonzo (US Patent No. 4,557,773) in view of Higuchi *et al.* (US Patent No. 4,293,357) and in further view of Ogawa *et al.* (US Patent No. 4,559,193).

Bonzo ('773) in view of Higuchi *et al.* ('357) teaches the basic claimed process as described above.

Regarding claim 23, Bonzo ('773) in view of Higuchi *et al.* ('357) do not teach changing hole size in the film in accordance with the cell size. Ogawa *et al.* ('193) teach a process for sealing a ceramic honeycombed structure including forming holes (7) in film (6), said holes having a size that is dependent on the size of the cells (see col. 4, line 65 through col. 5, line 1 and, Figures 5 and 6). Therefore, it would have been obvious for one of ordinary skill in the art to have formed the holes in the film having a size depending on the cell size as taught by Ogawa *et al.* ('193) in the process of Bonzo ('773) in view of Higuchi *et al.* ('357) because, Ogawa *et al.* ('193) specifically teaches that by having holes similar in size with the cell size a more efficient sealing results, hence an improved product is obtained (see col. 4, lines 25-35 and 55-61).

11. Claims 24 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonzo (US Patent No. 4,557,773) in view of Higuchi *et al.* (US Patent No. 4,293,357) and in further view of Noddin (US Patent No. 5,868,950).

Bonzo ('773) in view of Higuchi *et al.* ('357) teaches the basic claimed process as described above.

Regarding claims 24 and 26, Bonzo ('773) in view of Higuchi *et al.* ('357) do not teach laser drilling about the center of gravity in a spiral pattern. Noddin ('950) teaches laser drilling of a resin sheet including a pattern in which the beam spot starts in the center of the desired via (center of gravity) and gradually spirals outwardly to an outer diameter of the via at which point the beam is caused to orbit around the via center for as many revolutions as is determined necessary for the particular via (see col. 11, lines 5-11). Therefore, it would have been obvious for one of ordinary skill in the art to have laser drilled the holes in the film about the center of gravity of the hole in a spiral pattern as taught by Noddin ('950) in the process of Bonzo ('773) in view of Higuchi *et al.* ('357) because, Noddin ('950) specifically teaches that such a pattern provides for an improved process control of the size and shape of the resulting vias, hence providing for an improved product.

12. Claims 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bonzo (US Patent No. 4,557,773) in view of Higuchi *et al.* (US Patent No. 4,293,357) and in further view of Gawa *et al.* (US Patent No. 6,090,330).

Bonzo ('773) in view of Higuchi *et al.* ('357) teaches the basic claimed process as described above.

Regarding claims 27-31, although Bonzo ('773) in view of Higuchi *et al.* ('357) teach a laser control system as described above, Bonzo ('773) in view of Higuchi *et al.* ('357) do not teach a laser process including a demarcation of the resin sheet to be processed into multiple sections, processing each section on an individual basis and moving the next section to be processed to the processing area. Gawa *et al.* (330) teach a process for forming holes in a resin

sheet including, dividing said resin sheet into a plurality of demarcation sections (1a), forming holes using a laser in each section individually and then translating the resin sheet to the next demarcation section (see col. 8, lines 21-45). Therefore, it would have been obvious for one of ordinary skill in the art to have used a laser control process including a demarcation of the sheet to be processed into multiple sections and processing each section on an individual basis as taught by Gawa *et al.* (330) in the process of Bonzo ('773) in view of Higuchi *et al.* ('357) because, Gawa *et al.* (330) specifically teach that such a process allows for a more precise laser processing, hence providing for an improved product and process control, while allowing processing of a large number of holes in a more precise manner, hence improving productivity.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (703) 305-0396. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM and alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard D. Crispino, can be reached at (703) 308-3853. The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Stefan Staicovici, PhD

Primary Examiner 4|6|03

AU 1732

April 6, 2003